

# E-Tech S

160 - 240 - 380

## INSTALLATION, OPERATION & MAINTENANCE



Instructions for the User and the Installer

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We accept no liability should any damage result from the failure to comply with the instructions contained in this technical manual.

This manual contains important information with respect to the installation, the starting up and the maintenance of the appliance.

This manual must be provided to the user, who will read it carefully and keep it in a safe place.

## Essential instructions for safety

- It is prohibited to carry out any modifications to the appliance without the manufacturer's prior and written agreement.
- The product must be installed by a qualified engineer, in accordance with applicable local standards and regulations.
- The installation must comply with the instructions contained in this manual and with the standards and regulations applicable to heating systems.
- Failure to comply with the instructions in this manual could result in personal injury or a risk of environmental pollution.
- The manufacturer declines all liability for any damage caused as a result of incorrect installation or in the event of the use of appliances or accessories that are not specified by the manufacturer.

## Essential instructions for the correct operation of the appliance

- In order to ensure that the appliance operates correctly, it is essential to have it serviced by a certified installer or maintenance contractor every year.
- In case of anomaly, please call your service engineer.
- Faulty parts may only be replaced by genuine factory parts.

## General remarks

- The availability of certain models as well as their accessories may vary according to markets.
- The manufacturer reserves the right to change the technical characteristics and features of its products without prior notice. Please check for an updated version of this manual in the documentation page on the website [www.acv.com](http://www.acv.com).
- In spite of the strict quality standards that ACV applies to its appliances during production, inspection and transport, faults may occur. Please immediately notify your approved installer of any faults.

## GENERAL SAFETY INSTRUCTIONS FOR ELECTRIC APPLIANCES

**BEFORE CARRYING OUT ANY WORK ON THE BOILER, MAKE SURE THAT ALL ELECTRICAL SUPPLIES ARE ISOLATED.**

**MAKE SURE THAT THE WIRING SYSTEM AND THE POWER INPUT LINES ARE DESIGNED AND INSTALLED BY A REGISTERED COMPANY, IN COMPLIANCE WITH THE APPLICABLE REGULATIONS.**

**DO NOT STORE ANY FLAMMABLE OR CORROSIVE PRODUCTS, PAINT, SOLVENTS, SALTS, CHLORIDE PRODUCTS AND OTHER DETERGENT PRODUCTS NEAR THE APPLIANCE.**

**THIS APPLIANCE IS NOT INTENDED FOR USE BY PERSONS (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF EXPERIENCE AND KNOWLEDGE, UNLESS SUPERVISED OR UNLESS THEY HAVE BEEN GIVEN INSTRUCTIONS CONCERNING THE USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY.**

**CHILDREN SHALL NOT PLAY WITH THE APPLIANCE.**

## MEANING OF SYMBOLS

### Symbols on the packaging



Fragile



Keep dry



Keep standing, up



Danger of tipping over



Hand truck or pallet truck required for transport

### Symbols on the appliance



Domestic Hot Water circuit



Primary circuit



Electricity

### Symbols in the manual



Essential recommendation for safety (of persons and equipment)



Essential recommendation for electrical safety (electrical hazard)



Essential recommendation for the correct operation of the appliance or the system



General remark



Safety valve connected to the sewage system



Connection to the sewage system

## WHAT TO CHECK ON A REGULAR BASIS



Essential recommendations for the correct operation of the appliance

- Check regularly that the system water pressure is at least 0.1 MPa (1 bar) when cold. If the pressure drops below 0.05 MPa (0.5 bar), the built-in pressure sensor blocks the appliance until the pressure exceeds 0.08 MPa (0.8 bar).
- If it is required to top up the system to maintain the minimum recommended water pressure, always turn the appliance off and only add small amounts of water at a time. If a large amount of cold water is added in a hot boiler, the appliance can be damaged definitively.
- If the system needs to be refilled repeatedly with water, or if there is water on the floor under the boiler, contact your service engineer.

## BOILER MARKING

Location: Back panel



The part number (Code) and serial number (S/N) of the appliance are indicated on its rating plate and must be provided to ACV in case of warranty claim. Failure to do so will make the claim void.

## PRODUCT DESCRIPTION

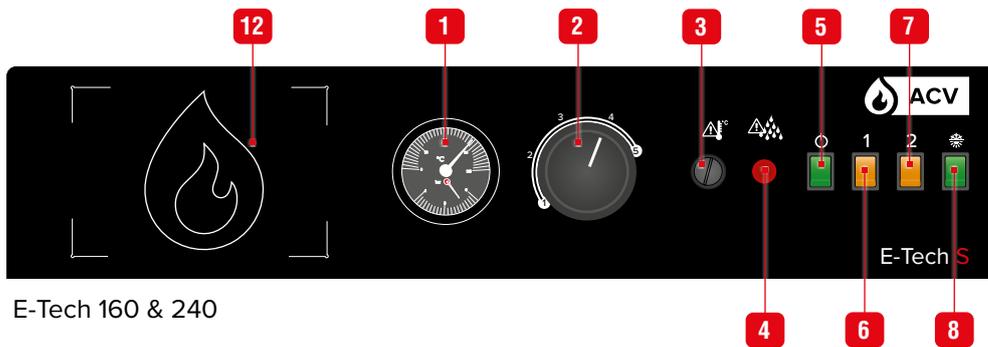
This floor-standing electric boiler is available in 4 models:

- The E-Tech S 160 single phase model is supplied with 230 Volt.
- The E-Tech S 160 / 240 / 380 three-phase models are supplied with 400 Volt.

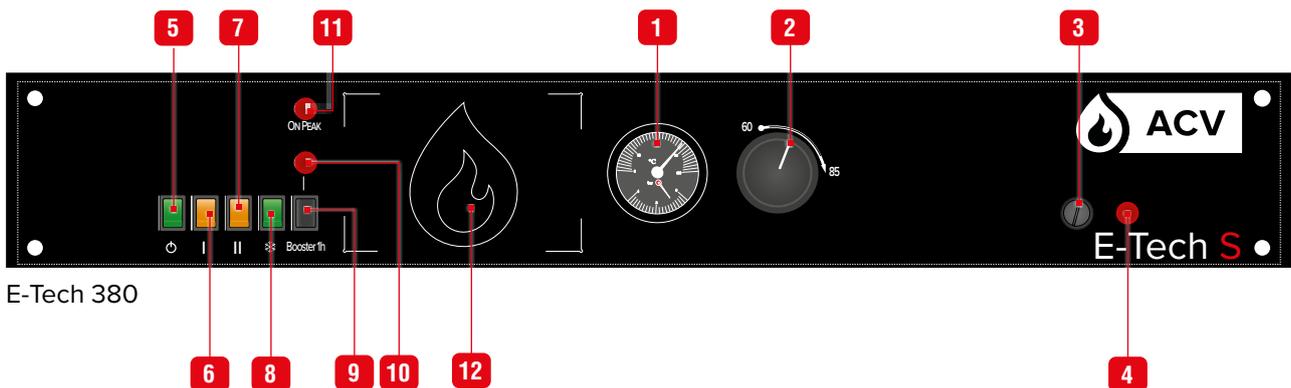
## USING THE CONTROL PANEL

1. **Temperature-pressure gauge** - This gauge displays the boiler temperature and the pressure inside the primary circuit. -
2. **Control thermostat** - Allows to define the temperature setpoint for the primary circuit.  
On E-Tech S 160-240, each number around the dial corresponds to a specific temperature:  
1 = 25°C 2 = 40°C 3 = 55°C 4 = 70°C 5 = 85°C  
On E-TEch S 380, the two-stage control thermostat is adjustable from 60 at 85°C.
3. **Manual reset high limit thermostat** - If the boiler temperature exceeds 103°C, the safety device is activated and the indicator light is turned on. Refer to *"Resetting the High Limit Safety Thermostat"* on page 21 for the reset procedure.

4. **Overheating Indicator light** - The lamp turns on when the safety thermostat is activated because the primary circuit temperature is too high (103°C).
5. **ON/OFF switch** - to start and stop the appliance.
- 6 & 7 **Power level switches** - The control panel is comprised of two switches that allow the user to select the power of the appliance. When only the first switch is pushed in, the power of the boiler is limited to the first stage, i.e. about half the total power. For operation at full power, both switches must be pushed in.
8. **Summer/Winter switch** - Allows the operation of the boiler for the exclusive production of Domestic Hot Water, if an external tank is installed.
9. **Booster switch**
10. **Booster indicator light**
11. **On peak indicator light**
12. **Location for optional internal controller** - Refer to the manual provided with the accessory.



E-Tech 160 & 240



E-Tech 380

## ELECTRICAL CHARACTERISTICS

 The maximum power can be adjusted for all models by acting on the control panel switches.

Models		Level 1	Level 2
E-Tech S 160 single phase and three-phase	kW	9,6 (66%)	4,8 (33%)
E-Tech S 240 three-phase	kW	14,4 (50%)	14,4 (50%)
E-Tech S 380 three-phase	kW	14,4 (50%)	14,4 (50%)

 The maximum power can be limited for this model by acting on the terminal bridges S8 or TB2.

Models		Min	Max
E-Tech S 160 single phase and three-phase	kW	7,2	14,4
E-Tech S 240 three-phase	kW	14,4	28,8
E-Tech S 380 three-phase	kW	7,2	28,8

### E-TECH S

MAIN CHARACTERISTICS			160		240	380
			Mono	Tri	Tri	Tri
Power	max	kW	14,4	14,4	28,8	28,8
	min	kW	7,2	7,2	14,4	7,2
		A	63	21	42	42
Rated voltage		V	2 x 230	3 x 400 + N	3 x 400 + N	3 x 400 + N
Rated frequency		Hz	50	50	50	50
Ohmic resistance of heating elements		Ohm	22	22	22	22
Heating element type		kW	2 x 2,4	2 x 2,4	2 x 2,4	2 x 2,4
Number of heating elements			6	6	6	7

## SIZING THE SUPPLY WIRES

The supply wires are sized depending of the type and current of the Magnetic Circuit Breaker (MCB), the latter being sized according to the nominal current of the boiler.

The admissible current of the supply wires depends on the ambient temperature, the section and length of the wires, the wires insulation, the wires assembly, the type of installation and the environment.

The following values are provided for information, considering an ambient temperature of 30°C and a maximal length of 5 meters. In all the cases, the installation must be performed in accordance with the applicable Wiring Regulations.

Nominal section (mm)	Nominal current of the MCB (A)
1.5	16
2.5	25
4	32
6	40
10	63
16	80



Also refer to "  " on page 4 of ML manual for the complete wiring diagrams.

## HYDRAULIC CHARACTERISTICS

Main Characteristics		E-TECH S		
		160	240	380
Capacity (primary)	L	68	86	131
Capacity (DHW)	L	99	164	263
Total capacity	L	167	250	394
Primary circuit expansion vessel volume	L	12	12	2 X 8
Heating connection	Ø	1" [F]	1" [F]	1" [F]
DHW connection	Ø	3/4" [M]	3/4" [M]	1"1/2 [M]
Auxiliary connection	Ø	3/4" [F]	3/4" [F]	1"1/2 [M]

## DHW PERFORMANCE

Domestic hot water performance (cold drink water at 10°C)			E-TECH S		
Operating conditions at 80 °C			160	240	380
Constant flow at	40 °C [ $\Delta T = 30$ K]	L/h	413	827	827
Peak flow at	40 °C [ $\Delta T = 30$ K]	L/10'	356	545	875
Peak flow at	40 °C [ $\Delta T = 30$ K]	L/60'	700	1234	1564
Tank refill time at 60 °C					
Initial heating time		minutes	36	41	67
After drawing off 140 litres at 45 °C		minutes	16	12	12

## MAXIMUM OPERATING CONDITIONS

### Maximum Service Pressure

- Primary circuit : ..... 0.3 MPa (3 bar)
- DHW circuit : ..... 0.86 MPa (8,6 bar)
- Recommended pressure relief valve (central heating) : ..... 0.3 MPa (3 bar)
- Recommended pressure relief valve (DHW) : ..... 0.7 MPa (7 bar)

### Mains supply pressure

- Max 0.6 MPa (6 bar), without a pressure reducing valve being required (to avoid discharge of the safety pressure valve)

### Maximum Operating Conditions

- Maximum temperature (primary) : ..... 85°C
- Maximum temperature (DHW) : ..... 85°C

### Water Quality

Refer to "*Recommendations for the prevention of corrosion and scaling in Heating Systems*" on page 8

## RECOMMENDATIONS FOR THE PREVENTION OF CORROSION AND SCALING IN HEATING SYSTEMS

### How oxygen and carbonates can affect the heating system

Oxygen and dissolved gasses in the water of the primary circuit contribute to the oxidation and the corrosion of the system components that are made of ordinary steel (radiators, ...). The resulting sludge is then deposited in the appliance exchanger.

The combination of carbonates and carbon dioxide in the water results in the formation of scale on the hot surfaces of the installation, including those of the appliance exchanger.

These deposits in the heat exchanger reduce the water flow rate and thermally insulate the exchange surfaces, which is likely to damage them.

### Sources of oxygen and carbonates in the heating circuit

The primary circuit is a closed circuit; the water it contains is therefore isolated from the mains water. When maintaining the system or filling up the circuit, water renewal results in the addition of oxygen and carbonates in the primary circuit. The larger the water volume in the system, the larger the addition.

Hydraulic components without an oxygen barrier (PE pipes and connections) admit oxygen into the system.

### Prevention Principles

#### 1. Clean the existing system before installing a new appliance

Before the system is filled, it must be cleaned in accordance with standard EN14336. Chemical cleaning agents can be used.

If the circuit is in bad condition, or the cleaning operation was not efficient, or the volume of water in the installation is substantial (e.g. cascade system), it is recommended to separate the appliance from the heating circuit using a plate-to-plate exchanger or equivalent. In that case, it is recommended to install a hydrocyclone or magnetic filter on the installation side.

#### 2. Limit the fill frequency

Limit fill operations. In order to check the quantity of water that has been added into the system, a water meter can be installed on the filling line of the primary circuit.

Automatic filling systems are not recommended unless the fill frequency is monitored and the scale and corrosion inhibitor remain at the correct levels.

If your installation requires frequent water refilling, make sure your system is free of water leaks.

Inhibitors may be used in accordance with standard EN 14868.

#### 3. Limit the presence of oxygen and sludge in the water

A deaerator (on the appliance flow line) combined with a dirt separator (upstream of the appliance) must be installed according to the manufacturer's instructions.

ACV recommends using additives that keep the oxygen in solution in the water, such as Fernox ([www.fernox.com](http://www.fernox.com)) and Sentinel ([www.sentinel-solutions.net](http://www.sentinel-solutions.net)) products.

The additives must be used in accordance with the instructions issued by the manufacturer of the water treatment product.

#### 4. Limit the carbonate concentration in the water

The fill water must be softened if its hardness is higher than 20° fH (11,2° dH).

Check regularly the water hardness and enter the values in the service log.

#### Water hardness table :

Water hardness	°fH	°dH	mmolCa(HCO <sub>3</sub> ) <sub>2</sub> / l
Very soft	0 - 7	0 - 3.9	0 - 0.7
Soft	7 - 15	3.9 - 8.4	0.7 - 1.5
Fairly hard	15 - 25	8.4 - 14	1.5 - 2.5
Hard	25 - 42	14 - 23.5	2.5 - 4.2
Very hard	> 42	> 23.5	> 4.2

#### 5. Control the water parameters

In addition to the oxygen and the water hardness, other parameters of the water must be checked.

Treat the water if the measured values are outside the range.

Acidity	6,6 < pH < 8,5
Conductivity	< 400 μS/cm (at 25°C)
Chlorides	< 125 mg/l
Iron	< 0,5 mg/l
Copper	< 0,1 mg/l

## G3 REQUIREMENTS AND GUIDANCE

### Discharge pipe from safety valves

The *Building Regulation G3* requires that any discharge from an unvented system is conveyed to where it is visible, but will not cause danger to persons in or about the building.

The tundish and discharge pipes should be fitted in accordance with the requirements and guidance notes of Building Regulation G3. The G3 Requirements and Guidance sections 3.50 - 3.63 are detailed below.

For discharge pipe arrangements not covered by G3 Guidance advice should be sought from your local Building Control Officer.

Main characteristics :

- Any discharge pipe connected to the pressure relief devices (Expansion Valve and Temperature/Pressure Relief Valve) must be installed in a continuously downward direction and in a frost free environment.
- Water may drip from the discharge pipe of the pressure relief device.
- This pipe must be left open to the atmosphere.
- The pressure relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked.

A typical discharge pipe arrangement is shown below.

#### General remarks

- Discharge pipe-work D2 can now be a plastic pipe but only pipes that have been tested to a minimum 110°C must be used.
- Discharge pipe D2 can now be plumbed into the soil stack but only soil stacks that can handle temperatures of 99°C or greater should be used.

Extract from “The Building Regulation G3” :

#### Discharge pipe D1

3.50 Safety devices such as temperature relief valves or combined temperature and pressure and pressure relief valves (see paragraphs 3.13 or 3.18) should discharge either directly or by way of a manifold via a short length of metal pipe (D1) to a tundish.

3.51 The diameter of discharge pipe (D1) should be not less than the nominal outlet size of the temperature relief valve.

3.52 Where a manifold is used it should be sized to accept and discharge the total discharge from the discharge pipes connected to it.

3.53 Where valves other than the temperature and pressure relief valve from a single unvented hot water system discharge by way of the same manifold that is used by the safety devices, the manifold should be factory fitted as part of the hot water storage system unit or package.

#### Tundish

3.54 The tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible to, and lower than, the valve, with no more than 600mm of pipe between the valve outlet and the tundish.

Note: To comply with the Water Supply (Water Fittings) Regulations, the tundish should incorporate a suitable air gap.

3.55 Any discharge should be visible at the tundish. In addition, where discharges from safety devices may not be apparent, e.g. in dwellings occupied by people with impaired vision or mobility, consideration should be given to the installation of a suitable safety device to warn when discharge takes place, e.g. electronically operated.

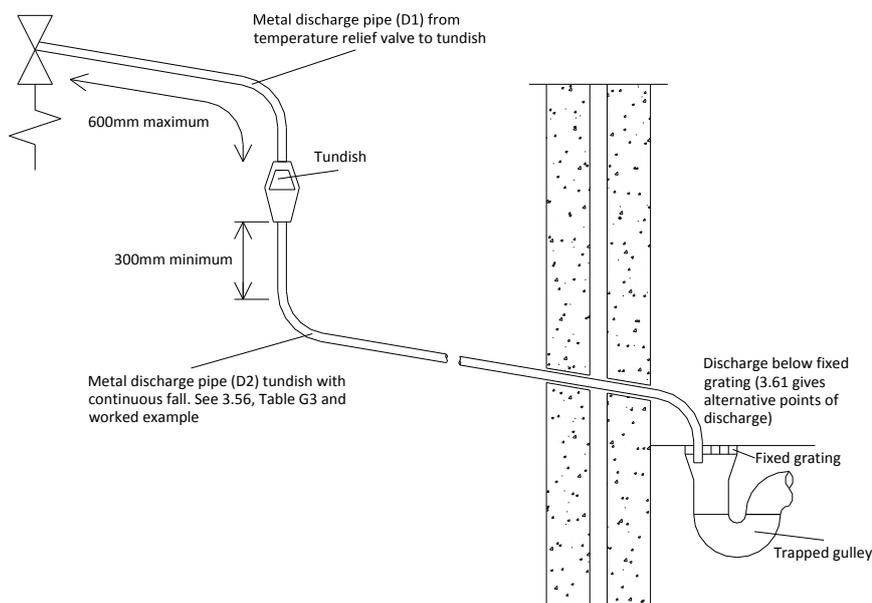


Figure G3: Typical discharge pipe arrangement

### Discharge pipe D2

- 3.56 The discharge pipe (D2) from the tundish should:
- (a) have a vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipework; and
  - (b) be installed with a continuous fall thereafter of at least 1 in 200.
- 3.57 The discharge pipe (D2) should be made of:
- (a) metal; or
  - (b) other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard (e.g. as specified in the relevant part of BS 7291)
- 3.58 The discharge pipe (D2) should be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long, i.e. for discharge pipes between 9m and 18m the equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device; between 18 and 27m at least 3 sizes larger, and so on; bends must be taken into account in calculating the flow resistance. See figure, table and the worked example.
- 3.59 Where a single common discharge pipe serves more than one system, it should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected.
- 3.60 The discharge pipe should not be connected to a soil discharge stack unless it can be demonstrated that that the soil discharge stack is capable of safely withstanding temperatures of the water discharged, in which case, it should:
- (a) contain a mechanical seal, not incorporating a water trap, which allows water into the branch pipe without allowing foul air from the drain to be ventilated through the tundish;
  - (b) be a separate branch pipe with no sanitary appliances connected to it;

(c) if plastic pipes are used as branch pipes carrying discharge from a safety device they should be either polybutalene (PB) to Class S of BS 7291-2:2006 or cross linked polyethylene (PE-X) to Class S of BS 7291-3:2006; and (d) be continuously marked with a warning that no sanitary appliances should be connected to the pipe.

**Note:**

1. Plastic pipes should be joined and assembled with fittings appropriate to the circumstances in which they are used as set out in BS EN ISO 1043-1.
2. Where pipes cannot be connected to the stack it may be possible to route a dedicated pipe alongside or in close proximity to the discharge stack.

**Termination of discharge pipe**

- 3.61 The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge.
- 3.62 Examples of acceptable discharge arrangements are:
- (b) to a trapped gully with the end of the pipe below a fixed grating and above the water seal;
  - (c) downward discharges at low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility; and
  - (d) discharges at high level: e.g. into a metal hopper and metal downpipe with the end of the discharge pipe clearly visible or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges.
- 3.63 The discharge would consist of high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

Table G3 – Sizing of copper discharge pipe 'D2' for common temperature relief valve outlet sizes

Valve outlet size	Minimum size of discharge pipe D1	Minimum size of discharge pipe D2 from tundish	Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend.
<b>G½</b>	15mm	22mm	Up to 9m	0.8m
		28mm	Up to 8m	1.0m
		35mm	Up to 27m	1.4m
<b>G¾</b>	22mm	28mm	Up to 9m	1.0m
		35mm	Up to 8m	1.4m
		42mm	Up to 27m	1.7m
<b>G1</b>	28mm	35mm	Up to 9m	1.4m
		42mm	Up to 8m	1.7m
		54mm	Up to 27m	2.3m

## SAFETY INSTRUCTIONS FOR THE INSTALLATION



### General remarks

- The connections (electrical, hydraulic) must be carried out in accordance with current applicable standards and regulations.



### Essential recommendations for the correct operation of the appliance

- The boiler must be installed in a dry and protected area, with an ambient temperature comprised between 0°C and 45°C.
- Install the appliance to ensure easy access at all times.
- Make sure to install a pressure reducing valve set at 4.5 bar if the mains supply pressure is in excess of 6 bar.



### Essential recommendations for safety

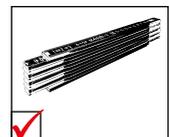
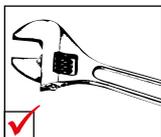
- Install the boiler on a base made of non-combustible materials.
- Do not use or store any flammable, explosive or corrosive products, such as paint, solvents, salts, chloride products and other detergent products near the appliance
- This appliance is not constructed for installation in zone 3.



### Essential recommendations for the electrical safety

- Only an approved installer is authorized to carry out the electrical connections.
- The appliance must be connected to the earth.
- Install a 2-way switch and a fuse or circuit breaker of the recommended rating outside the appliance, so as to be able to shut power down when servicing the appliance or before performing any operation on it.
- Isolate the external electrical supply of the appliance before performing any operation on the electrical circuit.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless supervised or unless they have been given instruction concerning the use of the appliance by a person responsible for their safety.

## TOOLS REQUIRED FOR THE INSTALLATION



## PACKAGE CONTENTS

The E-Tech S boilers are delivered assembled and packaged.

**i** At product reception and after removal of packaging, check the package contents and that the appliance is free of damages.

### Contents of the E-Tech S 160 - 240 - 380

- Electrical boiler
- Installation, Operation and Maintenance Instructions
- Check valve \*
- Safety valve \*
- Drain valve \*

\* Installed in factory on E-Tech S 380 model

## HANDLING INSTRUCTIONS

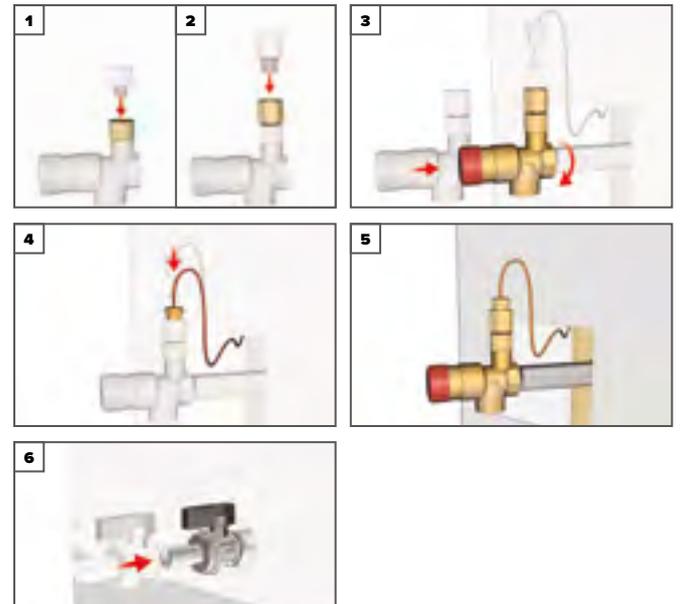
- 👉** • The weight of this boiler is more than 100Kg, which could present a risk of injury. Ask for help to lift it or handle it, and use an appropriate transport/lifting means.
- Bring the appliance as close as possible to the installation location before removing the packaging.

## REMOVING THE BOILER FROM THE PACKAGING

**👉** Before removing the packaging, ensure that the installation area is clear and that there are no obstacles, that would make the installation difficult or unsafe.

1. Remove the packaging as well as the protection pieces and discard in accordance with applicable local regulations.
2. With help from another person and an appropriate means of transport, bring the boiler to its location of installation.

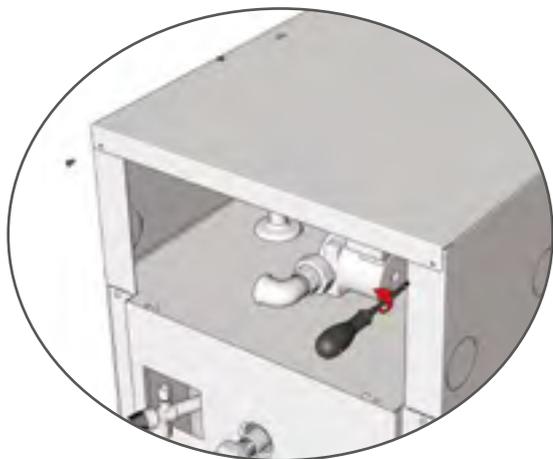
## BOILER PREPARATION BEFORE INSTALLATION: E-TECH S 160 - 240



**👉** Essential recommendations for the correct operation of the system

- The drain valve and the safety valve must be connected to the sewer.
- The boiler is fitted with a primary expansion volume of :
  - 12 litres for the E-Tech S 160 and 240.
  - 2 x 8 litres for the E-Tech S 380.
- If the expansion vessel volume is not sufficient for your needs, it is possible to install an additional expansion vessel.
- The boiler is fitted with a safety valve set to 0.3 MPa (3 bar).

## REMOVAL AND INSTALLATION OF THE ACCESS PANELS



## RECOMMENDATIONS FOR THE HYDRAULIC INSTALLATION



### Essential recommendations for safety

- The hot water output may reach temperatures in excess of 60°C, which can cause scalding! It is therefore necessary to install a thermostatic mixing valve after the appliance.
- The DHW circuit of the system must be fitted with an approved safety group, comprised of a 0.7 MPa (7 bar) safety valve, a check valve and a shut-off valve.
- If the boiler is not equipped with one, the heating circuit of the system must be fitted with an approved safety pressure relief valve, according to the pressure mentioned on the type plate.
- Use a two-wrench method when tightening field piping onto the boiler piping connections. Use one wrench to prevent the boiler connections from the turning and the second to tighten field piping. Failure to support the boiler piping connections could damage piping or cause a leak.



### Essential recommendations for the correct operation of the appliance

- Flush the system before connecting the domestic hot water circuit. Refer to the installation instructions.
- Make sure to install a pressure reducing valve set at 0.45 MPa (4.5 bar) if the mains supply pressure is in excess of 0.6 MPa (6 bar).
- It is recommended to install an expansion vessel in the DHW circuit to prevent the safety valve from opening constantly and reduce the water hammer effect in the system.
- If the appliance is used as a domestic hot water preparation tank, a primary expansion vessel adapted to the boiler power/size and to the type of system must be fitted in the heating circuit (if there is no built-in expansion vessel, or if the built-in expansion vessel size is not sufficient).



### General remark

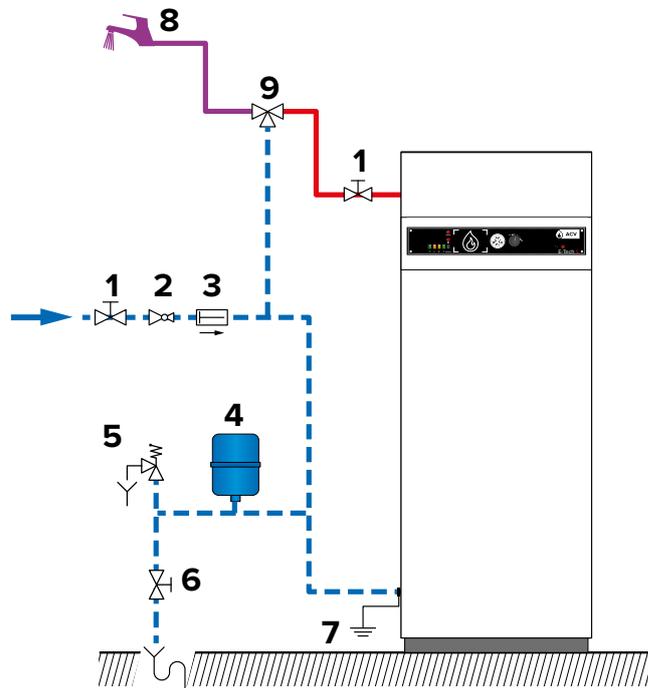
- The circuit illustrations are basic principle diagrams only.

## DHW CONNECTION

### Description

1. Isolating valve
2. Pressure reducing valve
3. Check valve
4. DHW expansion vessel
5. Safety valve\*
6. Drain valve
7. Grounding
8. Draw-off tap
9. Thermostatic mixing valve

--- Cold water  
--- Hot water



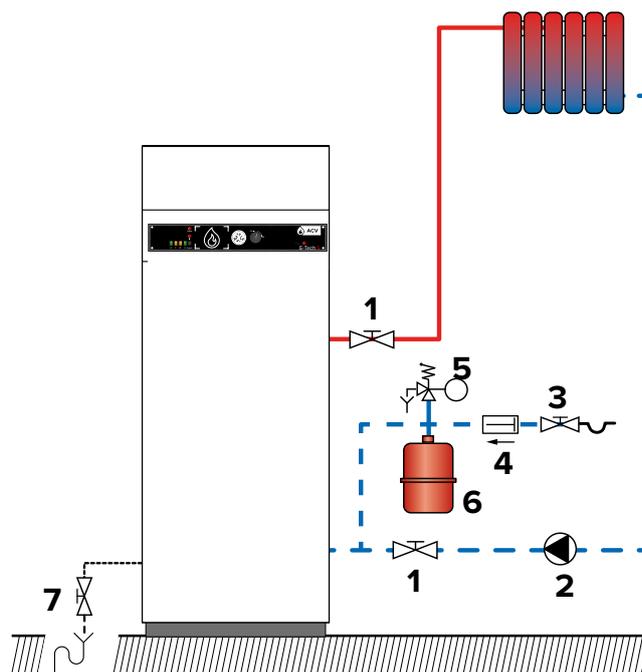
## HEATING CONNECTION



Make sure to install isolating valves on the system heating circuit, so as to be able to drain the boiler, without draining the whole system.

### Description

1. Isolating valve
2. Heating pump
3. Filling valve
4. Check valve
5. Safety valve (provided)
6. Expansion vessel
7. Drain valve



## SAFETY INSTRUCTIONS FOR THE ELECTRICAL INSTALLATION



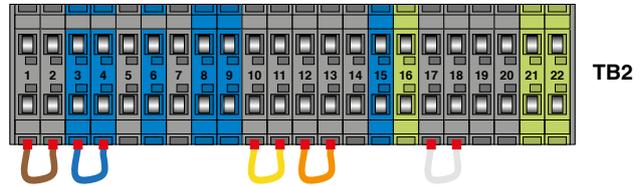
- Electrical connections must be carried out by a qualified technician, in accordance with regulations applicable to electrical systems.
- As far as the power input to the boiler is concerned, the installation must comply with standard EN 60364-1 that define the applicable levels of insulation, and with all provisions applicable to installation conditions.
- For protection against electrical hazard, it is always recommended to install a differential cut-out device (Ground Fault Isolator) on the power supply circuit, upstream of the boiler.
- The control circuit is protected by a 3A magnetic circuit breaker.
- The default electrical safeties integrated in the boiler protect the internal parts of the boiler.
- Any additional electrical safety device must be installed outside the boiler.
- For protection against overheating, it is advisable to place an external positive safety power cut-out, controlled by the boiler safety thermostat.
- This appliance must be permanently connected to fixed wiring and must be earthed.
- The wiring must be carried out by a competent person and in accordance with the current Wiring Regulations.

## ELECTRICAL CONNECTION : E-TECH S 160

### Connecting the accessories

The electrical accessories are connected to the numbered terminals shown on the diagram below.

E-Tech S 160



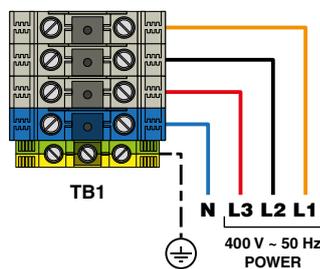
- 1-2 : Phase (230V ~ 50Hz)
- 3-4 : Neutral
- 5-6 : Time clock or controller supply (optional)
- 7-8 : Safety switch
- 10-11 : Stop Bridge or time clock switch control (optional)
- 12-13 : Room thermostat (optional)
- 14-15-16 : Heating pump
- 17-18 : Relay K3 deactivated

### Connecting the power supply

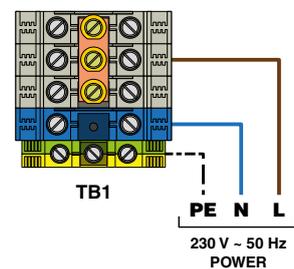
- E-Tech S 160 Three-phase : the power circuit must be connected using three phases (3 x 400 V ) + neutral.
- E-Tech S 160 Mono Phase : the power circuit must be connected using one phase (1 x 230 V ) + neutral.



E-Tech S 160  
Three-phase



E-Tech S 160  
Mono Phase

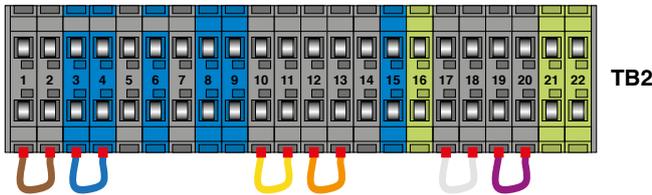


## ELECTRICAL CONNECTION : E-TECH S 240

### Connecting the accessories

The electrical accessories are connected to the numbered terminals shown on the diagram below.

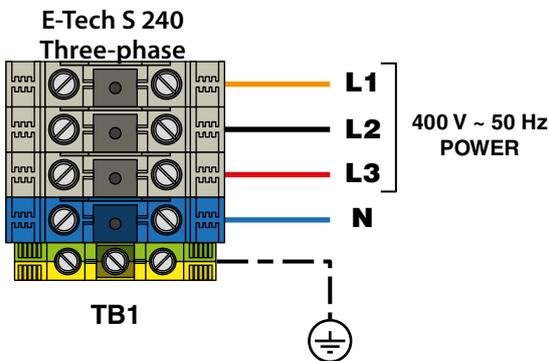
E-Tech S 240



- 1-2 : Phase (230V ~ 50Hz)
- 3-4 : Neutral
- 5-6 : Time clock or controller supply (optional)
- 7-8 : Safety switch
- 10-11 : Stop Bridge or time clock switch control (optional)
- 12-13 : Room thermostat (optional)
- 14-15-16 : Heating pump
- 17-18 : Relay K3 deactivated
- 19-20 : Relay K4 deactivated

### Connecting the power supply

E-Tech S 240 Three-phase : the power circuit must be connected using three phase (3 x 400 V ) + neutral.

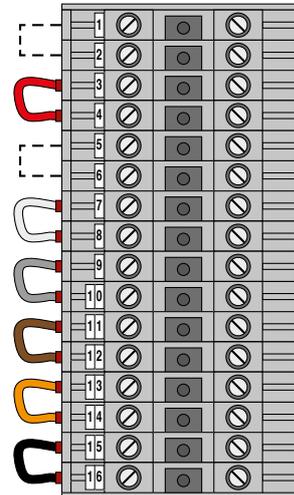


## ELECTRICAL CONNECTION : E-TECH S 380

### Connecting the accessories

The electrical accessories are connected to the numbered terminals shown on the diagram below.

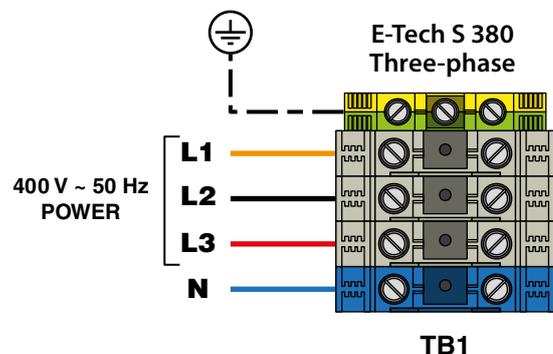
E-Tech S 380



- 1-2 : Time clock or controller supply (optional)
- 3-4 : Stop Bridge or time clock switch control (optional)
- 5-6 : day / night signal
- 7-8 : Room thermostat (optional)
- 9-10 : Relay K1 deactivated
- 11-12 : Relay K3 deactivated
- 13-14 : Relay K2 deactivated
- 15-16 : Relay K4 deactivated

### Connecting the power supply

E-Tech S 380 Three-phase : the power circuit must be connected using three phases (3 x 400 V ) + neutral.



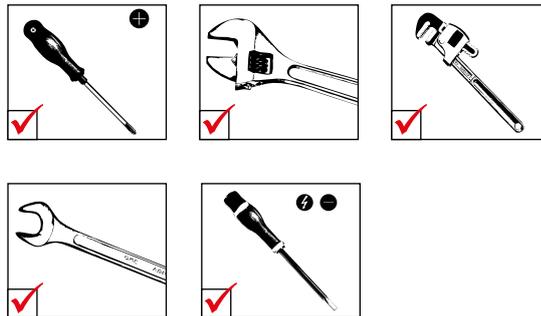
**SAFETY INSTRUCTIONS FOR STARTING UP**

**TOOLS REQUIRED FOR STARTING UP**



**Essential recommendations for safety**

- The components inside the boiler may only be accessed by an approved installer.
- Set the water temperature in accordance with usage and local plumbing codes.
- Make sure that the heating circuit filling valve is closed once the starting up process is complete.
- Make sure that all connections are made and tight.



**FILLING THE DHW CIRCUIT**



Put the DHW tank under pressure **before** pressurizing the heating (primary) circuit.

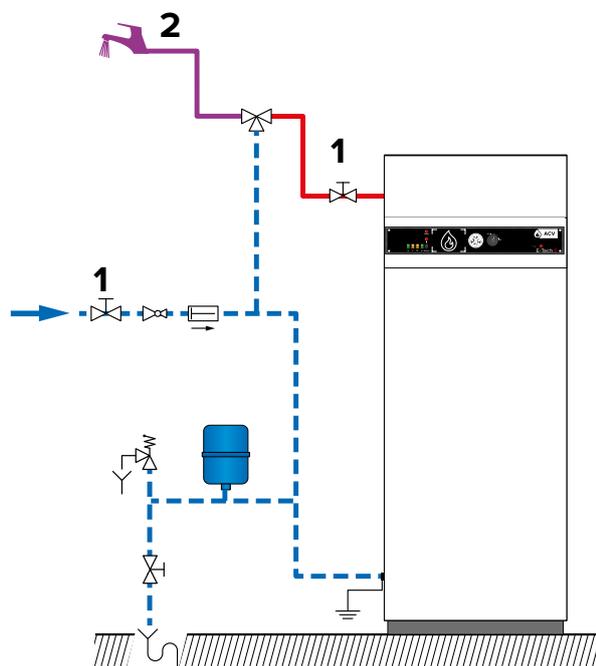
**Set-up conditions**

- External power supply isolated

**DHW circuit filling procedure**

1. Open the isolating valves (1) and the draw-off tap (2).
2. Once the water flow rate has stabilized and the air is totally evacuated from the system, close the draw-off tap (2).
3. Check all the connections for leaks.

- — — — — Cold water
- Hot water



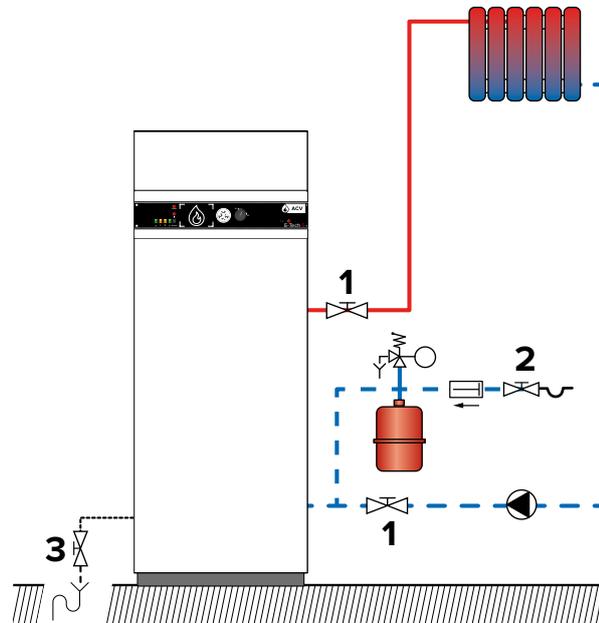
## FILLING THE HEATING CIRCUIT

### Heating circuit filling procedure

1. Open boiler front panel (refer to applicable procedure in the manual).
2. Open the isolating valves (1).
3. Make sure that the drain valve (3) is tightly closed.
4. Open the filling valve (2).
5. Once the system is bled from air, bring the pressure to the static pressure between 1.5 bar and 2 bar.
6. Close the filling valve (2).
7. Disconnect filling device from water supply.\*

### Follow-on tasks

1. Check there is no leak.



\* UK specific reference G24.1 & G24.2 of the Water Regulations Guide.

## STARTING THE BOILER

### Set-up conditions

- Hydraulic and electric connections made
- External power supply isolated
- Boiler on/off switch to “Off”
- Hydraulic circuits filled and under pressure

### Procedure



**Before starting the boiler, make sure that the air is bled from the heating circuit .**

1. Activate external power supply.
2. Place the ON/OFF master switch on the ON position (⏻).
3. If a room thermostat is installed, possibly increase the temperature set-point to generate a demand.



**If the boiler heating pump does not work, the boiler can be damaged and its life reduced. Check that the pump is running properly.**

4. Set the central heating and domestic hot water temperatures to the required values using the control panel.
5. After 5 minutes of operation, bleed the heating circuit until all air is evacuated and restore a 0.15 MPa (1.5 bar) pressure.
6. Bleed the central heating circuit once again and top it up with water to get the required pressure, if necessary.
7. Make sure that the central heating system is properly balanced and, if needed, adjust the valves to prevent certain circuits or radiators from getting a flow rate that is far above or below the set rate.

### Follow-on Task(s)



**After several days of operation, re-check all electrical and hydraulic connections for tightness, as well as the system operating pressure. Correct and adjust as necessary.**

## RECOMMENDATIONS FOR THE BOILER MAINTENANCE



Essential recommendations for the correct operation of the appliance



### Essential recommendations for the electrical safety

- Before opening the boiler for maintenance, turn off the boiler by pushing on the ON/OFF master switch.
- Isolate the external power supply of the appliance before performing any operation, unless it is required to take measurements or perform system setup.



### Essential recommendations for safety

- Water flowing out of the drain valve may be extremely hot and could cause severe scalding.
- Do not use solvents to clean any of the components. The components could be damaged, resulting in unreliable or unsafe operation.

- It is recommended to have the boiler serviced at least once a year or every 1,500 hours by a qualified technician, preferably at the start of the heating season. More frequent servicing may be required depending on boiler use. Please consult your installer for advice.
- The boiler maintenance will be carried out by a qualified engineer, and the defective parts may only be replaced by genuine factory parts.
- Make sure to replace any gaskets or seals on the removed components before reinstalling them.
- Control the tightness of the hydraulic circuit connections.

## BOILER SHUT-DOWN FOR MAINTENANCE

1. Switch the boiler off using the ON/OFF master switch
2. Isolate the external power supply.

## PERIODIC BOILER MAINTENANCE TASKS

Tasks	Frequency	
	Periodic inspection	
	End-user	1 year Professional
1. Make sure that the system water pressure is at least 0.1 MPa (1 bar) when cold. Top up the system if necessary, adding small quantities of water at a time. In case of repeated fills, call your installer.	X	X
2. Check that there is no water on the floor next to the boiler. Call your installer if there is.	X	X
3. Check that the thermostats and safety devices are working properly.		X
4. Check that all hydraulic connections are correctly fastened and tight.		X
5. Inspect the wiring and the heating elements looking for any sign of overheating.		X
6. Check that the screws on the connection terminal block are properly tightened.		X
7. Check visually the heating body: no evidence of corrosion, overheating or damages. Carry out all required cleaning tasks, repairs and replacements that might be required.		X

## DRAINING THE BOILER



### Essential instructions for safety

- Before draining the DHW tank, drain the heating (primary) circuit or bring its pressure to 0 bar.
- Water flowing out of the drain valve may be extremely hot and could cause severe scalding. Keep people away from the hot water discharge.

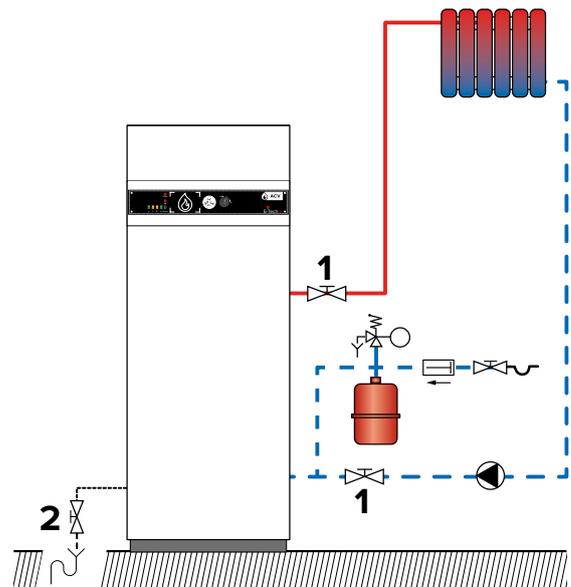
### Set-up conditions

- Boiler switched off using the ON/OFF master switch
- External power supply isolated
- Fuel/gas supply closed

### Heating circuit draining procedure

1. Close the isolating valves (1).
2. Connect the drain valve (2) to the sewer with a hose.
3. Open the drain valve (2) to empty the heating circuit of the boiler.
4. Close the drain valve (2) once the heating circuit of the boiler is empty.

— — — Cold water  
— — — Hot water

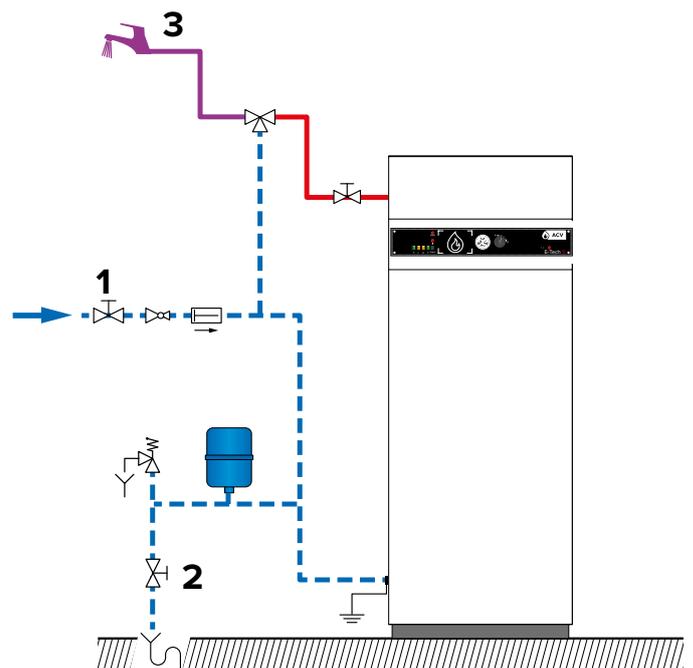


### DHW circuit draining procedure



**Before draining the DHW tank, make sure that the heating (primary) circuit pressure is null.**

1. Open fully a draw-off tap (3) for about 60 minutes to make sure that the DHW tank has cooled down.
2. Close the isolating valves (1).
3. Connect the drain valve (2) to the sewer with a hose.
4. Open the drain valve (2) and drain the DHW tank water to the sewer.
5. Open the draw-off tap (3) to accelerate the draining process. If it is located lower than the tank connection, open a draw-off tap located higher in the system.
6. Close the drain valve (2) and the draw-off tap (3) once the DHW tank of the boiler is empty.





Before carrying out any work on the system ensure that the boiler is cool and all electrical supplies are isolated.

## BOILER MAINTENANCE

### Set-up conditions

- Boiler shut down using the ON/OFF switch
- External power supply isolated (through the external electrical box)
- Boiler cooled down (if it was in operation)

### Procedure

1. Remove access panels. Refer to "*Removal and Installation of the Access Panels*" on page 13.
2. Perform a visual inspection of the boiler looking out for signs of water leakage from joints, expansion vessel, and the area around the elements on top of the boiler.
3. Perform a visual inspection of all wiring and cables in the boiler casing, checking for signs of overheating or burning.
4. Check all push-on electrical connectors for tightness and good connection to the relative components.
5. Using an appropriate screwdriver, check all electrical terminals for tightness.
6. Check all individual circuit breakers are in the normal position. If some fuses have tripped, check the wiring and the resistance before re-activating them.

### Follow-on task(s)

1. Restart the boiler, refer to "*Starting the boiler*" on page 18.

## CHECKING THE SAFETY DEVICES

1. Check the correct operation of the thermostats and safety devices.
2. Check the CH and DHW safety valves.

## RESETTING THE HIGH LIMIT SAFETY THERMOSTAT

### Set-up conditions

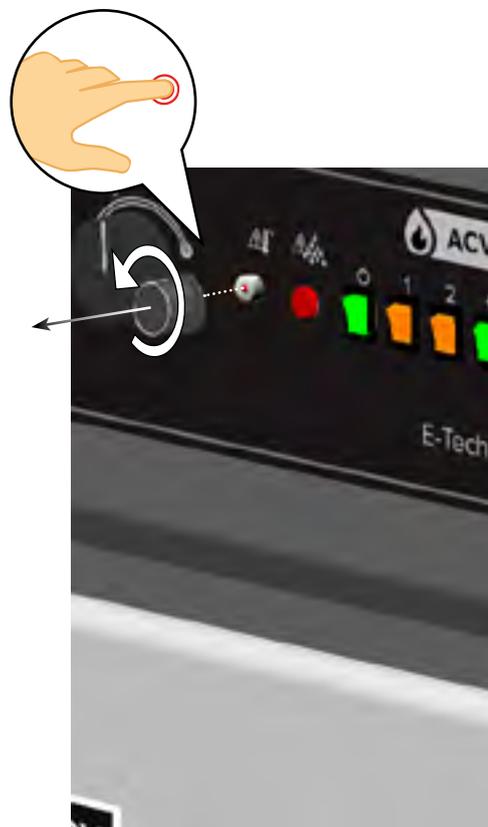
- Boiler shut down through the ON/OFF switch
- External power supply isolated (through the external electrical box)
- Boiler cooled down (if it was in operation) to <60°C

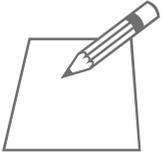
### Procedure

1. Unscrew and remove the cover from the safety thermostat.
2. Press the safety thermostat to reset it.
3. Reinstall the cover on the safety thermostat.

### Follow-on task(s)

1. Activate electrical power through the external electrical box
2. Turn the boiler on using the ON/OFF switch.
3. Check that the overheating indicator is turned off.





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